APPENDIX B

STATEMENT OF WORK FOR
REMEDIAL INVESTIGATION AND FEASIBILITY STUDY
NEW CASSEL/HICKSVILLE GROUND WATER CONTAMINATION SUPERFUND SITE
NASSAU COUNTY, New York

Operable Unit 3

I. INTRODUCTION

A. The purpose of the remedial investigation/feasibility study ("RI/FS") is to investigate the nature and extent of groundwater contamination at Operable Unit 3 ("OU3") of the New Cassel/Hicksville Ground Water Contamination Superfund Site (the "Site"), and develop and evaluate potential remedial alternatives. OU3 is defined as the area of impacted groundwater located downgradient of, and attributable to, OU1. The RI and FS are interactive and may be conducted concurrently so that the data collected in the RI influences the development of remedial alternatives in the FS, which in turn affects the data needs and the scope of treatability studies, if needed.

B. The RI/FS shall be conducted in a manner that minimizes environmental impacts in accordance with EPA Region 2 Clean and Green Policy (available at www.epa.gov/region02/superfund/green_remediation/policy.html) to the extent consistent with the National Contingency Plan ("NCP"), 40 CFR Part 300. Respondents shall follow Guidance on Systematic Planning using the Data Quality Objectives Process ("QA/G-4") EPA/240/B-06/001 February 2006, in planning and conducting the RI/FS.

C. Respondents shall conduct the RI/FS and shall produce draft RI and FS reports that are in accordance with this Statement of Work ("SOW"), the "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (U.S. EPA, OSWER Directive # 9355.3-01, October 1988 or subsequently issued guidance), and any other guidance that EPA uses in conducting an RI/FS, as well as any additional requirements in the Administrative Settlement Agreement and Order on Consent, Index No. CERCLA-02-2014-2020 ("Settlement Agreement"). The RI/FS Guidance describes the report format and the required report content. Respondents shall furnish all necessary personnel, materials, and services needed for, or incidental to, the performance of the RI/FS, except as otherwise specified in the Settlement Agreement.

D. At the completion of the RI/FS, EPA will be responsible for the selection of the remedy for OU3 at the Site and will document the remedy selection in a Record of Decision ("ROD"). The remedial action alternative selected by EPA will meet the cleanup standards specified in CERCLA Section 121, 42 U.S.C. § 9621. That is, the selected remedial action will be protective of human health and the environment, will be in compliance with, or include a waiver of, applicable or relevant and appropriate requirements of other laws ("ARARs"), will be cost-effective, will utilize permanent solutions and alternative treatment technologies or resource recovery technologies, to the maximum extent practicable, and will address the statutory

preference for treatment as a principal element. The final RI/FS report, as adopted by EPA, and the baseline risk assessment will, with the administrative record, form the basis for the selection of the remedy for OU3 at the Site and will provide the information necessary to support the development of the ROD.

E. As specified in CERCLA Section 104(a) (1), 42 U.S.C. § 9604(a)(1), EPA will provide oversight of Respondents' activities throughout the RI/FS. Respondents shall support EPA's initiation and conduct of activities related to the implementation of oversight activities.

II. TASK 1 – SITE CHARACTERIZATION SUMMARY REPORT

A. Following submission of the OU1 Pre-Design Vertical Profile Boring Investigative Memorandum and before any other work is commenced, EPA agrees that it will meet with the Respondents, collectively and/or individually, to review and analyze the conclusions of the Memorandum. If the results of the Memorandum demonstrate that one or more of the Respondents is not responsible for contamination within OU1, EPA agrees that Respondent or those Respondents shall have no further obligation and will not be required to undertake additional investigation or work or pay any additional costs with respect to OU1 or OU3.

Within one-hundred and twenty (120) days after the completion of EPA's review of the OU1 Pre-Design Vertical Profile Boring Investigative Memorandum, meeting(s) with Respondents, and determination by EPA as set forth in the preceding paragraph, or such longer time as specified or agreed to by EPA, the Respondents that remain responsible shall submit to EPA a Site Characterization Summary Report ("SCSR"). The overall objective of site characterization is to describe areas of OU3 at the Site that may pose a threat to human health or the environment. This is accomplished by determining the physical conditions, including physiography, geology, hydrology, and hydrogeology of OU3. Potential surface and subsurface pathways of migration and locations of contaminant reservoirs shall be defined. Respondents shall identify the sources of contamination and characterize the nature, extent, and volume of the sources of contamination, including their physical and chemical constituents as well as their concentrations at incremental locations relative to background concentrations in the affected media. Potential contaminant degradation processes shall be evaluated. Using this information, contaminant fate and transport is estimated. The data shall be discussed and shall be summarized in graphical and tabular form. Relevant physical information (e.g., the presence of free phase material) and information regarding the fate and transport of chemical constituents shall be summarized.

B. For the SCSR, all available existing data for OU3 shall be thoroughly compiled, reviewed, and summarized by Respondents. This data includes, but is not limited to, the results of previous investigations in and in the vicinity of OU3, historical information about the Site, including aerial photographs, and other available information. The SCSR shall include a preliminary Conceptual Site Model ("CSM") for OU3 and shall identify any additional data necessary to complete the RI/FS. A narrative summary and compiled spreadsheets, maps, graphs and figures, including but not limited to, an electronic database of all sampling data with coordinates and sampling dates, shall be included.

C. Within thirty (30) days after Respondents' submittal of the SCSR, or such longer time as specified in writing by EPA, Respondents shall make a presentation to EPA and the State on the findings of the SCSR. EPA will approve the SCSR or otherwise respond pursuant to Section IX (EPA Approval of Plans and Other Submissions) of the Settlement Agreement. When approved by EPA, the SCSR shall be incorporated into the RI Report for OU3 which is to be prepared in accordance with this SOW.

III. TASK 2 – RI/FS WORK PLAN

A. RI/FS Work Plan and Schedule. Within one-hundred and twenty (120) days after EPA's written authorization to proceed based on the SCSR, Respondents shall submit to EPA a detailed Work Plan for the completion of the RI/FS. The SCSR shall be used for planning the RI/FS Work Plan. The RI/FS Work Plan shall include, among other things, a detailed schedule for RI/FS activities at OU3. EPA will approve the RI/FS Work Plan or otherwise respond pursuant to Section IX (EPA Approval of Plans and Other Submissions) of the Settlement Agreement. The RI/FS Work Plan shall supplement existing data and shall satisfy the following general requirements:

1. Define Sources of Contamination

Respondents shall delineate each source of contamination in each media. For each such location, the areal extent and depth of contamination shall be determined by sampling at incremental depths on a sampling grid or appropriate boring or well locations or by other sampling means, as defined in the RI/FS Work Plan. The physical characteristics and chemical constituents and their concentrations shall be determined for all known and discovered sources of contamination. The amount of contaminant mass that exists in the underlying geologic and/or hydrogeologic units shall be estimated. Respondents shall conduct sufficient sampling to define the boundaries of the contaminant sources to the level established in the Quality Assurance/Quality Control Project Plan ("QAPP") and Data Quality Objectives ("DQOs").

Defining the source of contamination shall include analyzing the potential for contaminant release (e.g., long term leaching from soil), contaminant mobility and persistence, and characteristics important for evaluating remedial actions, including information to assess treatment technologies as well as impacts from potential upgradient and/or cross gradient sources.

2. Describe the Nature and Extent of Contamination

Respondents shall gather information to describe the nature and extent of contamination during the field investigation. To describe the nature and extent of contamination, Respondents shall utilize the information on OU3's physical and biological characteristics and sources of contamination to give a preliminary estimate of the contaminants that may have migrated, to what extent they have migrated, and their potential to migrate further. Respondents shall then implement a monitoring program and any other study program identified in the RI/FS Work Plan (which includes the QAPP) such that by using analytical

techniques sufficient to detect and quantify the concentration of contaminants in all media, including soil, geologic and/or hydrogeologic, the amount of contaminant degradation occurring and the migration of contaminants through the various media at OU3 can be determined. In addition, Respondents shall gather data for calculations of contaminant fate and transport. This process shall continue until the area and depth of contamination are known to the level of contamination established in the QAPP and DQOs. The information on the nature, extent and migration potential of contamination shall be used to determine the level of risk presented by OU3. Respondents shall use this information to help to determine aspects of the appropriate remedial action alternatives to be evaluated.

3. Evaluate Site Characteristics

Respondents shall analyze and evaluate the data at OU3 to: (1) describe physical and biological characteristics, (2) describe contaminant source characteristics, (3) determine the nature and extent of contamination, (4) determine the contaminant fate and transport, and (5) develop site-specific human health risk assessments. Results of OU3 physical characteristics, source characteristics, and extent and mobility of contamination analyses shall be utilized in the analysis of contaminant fate and transport. The evaluation shall include the actual and potential magnitude of releases from the sources, and horizontal and vertical spread of contamination as well as mobility and persistence of contaminants. Where modeling is appropriate, such models shall be identified to EPA in a technical memorandum prior to their use. All data and programming, including any proprietary programs, shall be made available to EPA together with a sensitivity analysis. Models proposed to be used with respect to OU3 shall be subject to EPA's approval and shall be performed in accordance with subsection 5 below. Analysis of data collected for characterization of OU3 shall meet the DQOs developed in the QAPP (or as revised during the RI).

4. Data Management Procedures

Respondents shall consistently document the quality and validity of field and laboratory data compiled during the RI.

a. Document Field Activities

Information gathered during characterization of OU3 shall be consistently documented and adequately recorded by Respondents in field logs and laboratory reports. The method(s) of documentation must be specified in the Work Plan and QAPP. Field logs or dedicated field log-books must be utilized to document observations, measurements, and significant events that have occurred during field activities. Laboratory reports must document sample custody, analytical responsibility, analytical results, adherence to prescribed protocols, nonconformity events, corrective measures, and/or data deficiencies.

b. Maintain Sample Management and Tracking

Respondents shall maintain field reports, sample shipment records, analytical results, and quality assurance/quality control ("QA/QC") reports to ensure that only validated analytical data are reported and utilized in the risk assessment and evaluation of remedial alternatives. Analytical results developed under the Work Plan must be accompanied by, or cross-referenced to, a corresponding QA/QC report when included in the SCSR, or addendum to the SCSR. In addition, Respondents shall safeguard chain of custody forms and other project records to prevent loss, damage, or alteration of project documentation.

5. Fate and Transport Model Memorandum

At EPA's request, Respondents shall submit a memorandum on a fate and transport model, unless they can demonstrate to EPA's satisfaction that such a model is unnecessary. If EPA determines that a fate and transport model is required and so notifies Respondents, Respondents shall, within ninety (90) days thereafter, or such longer time as specified in writing by EPA, submit the memorandum on the model. EPA will approve the memorandum or otherwise respond in accordance with Section IX (EPA Approval of Plans and Other Submissions) of the Settlement Agreement.

The RI/FS Work Plan shall address, but not be limited to, the following investigations:

1. Installation of additional ground water monitoring wells, to define the horizontal and vertical extent of the OU3 groundwater contaminant plume(s) and identify the source(s) of contamination migrating from OU1 into OU3, utilizing data results from the vertical profile boring activities from the OU1 RD Pre-Design Vertical Profile Boring work discussed in V.B of the OU1 RD SOW;
2. Evaluation of groundwater quality parameters for groundwater sampling;
3. Evaluation of monitored natural attenuation ("MNA") parameters for groundwater sampling;
4. Evaluation of groundwater flow in geologic and/or hydrogeologic units by measuring groundwater head at discrete depths;
5. Evaluation of geologic parameters, which may include but is not limited to geophysical investigations and an aquifer pump test;

The RI/FS Work Plan shall also include, but not be limited to, the following:

1. A QAPP, which shall be prepared consistent with the *Uniform Federal Policy for Quality Assurance Project Plans* ("UFP-QAPP"), Parts 1, 2 and 3, EPA-505-B-04-900A, B and C, March 2005 or newer, and other guidance documents referenced in the aforementioned guidance documents. The UFP documents may be found at: http://www2.epa.gov/fedfac/assuring-quality-federal-cleanups. In addition, the guidance and procedures located in the EPA Region 2 Quality Assurance web site:

http://www.epa.gov/region02/qa/documents.htm, as well as other OSWER directives and EPA Region 2 policies shall be followed, as appropriate.

a. All sampling and analyses performed pursuant to this Settlement Agreement shall conform to EPA policy and guidance regarding sampling, quality assurance, quality control, data validation, and chain of custody procedures. Respondents shall incorporate these procedures into the QAPP in accordance with the *Uniform Federal Policy for Implementing Quality Systems* (UFP-QS), EPA-505-F-03-001, March 2005; *Uniform Federal Policy for Quality Assurance Project Plans* (UFP-QAPP), Parts 1, 2, and 3, EPA-505-B-04-900A, B, and C, March 2005 or newer; and other guidance documents referenced in the aforementioned guidance documents. Subsequent amendments to the above, upon notification by EPA to Respondents of such amendments, shall apply only to procedures conducted after such notification.

b. The QAPP shall provide for collection of data sufficient to delineate site-related contamination in potentially affected media at OU3, to the extent necessary to select an appropriate remedy; to evaluate cross-media contaminant transport (e.g., soil to ground water or ground water to surface water) as necessary to support the assessment of risks associated with potential or actual exposures to site-related contamination under current and reasonably likely future conditions; and to evaluate remedial alternatives for those components that address site-related contamination (for example, sufficient engineering data for the projection of contaminant fate and transport and development and screening of remedial action alternatives, including information to assess treatment technologies).

c. The QAPP shall specifically include the following items:

    i. An explanation of the way(s) the sampling, analysis, testing, and monitoring will produce data for the RI/FS;

    ii. A detailed description of the sampling, analysis, and testing to be performed, including sampling methods, analytical and testing methods, sampling locations and frequency of sampling to be implemented to sample and analyze the contaminants found in groundwater, soil, air, and surface water, if necessary;

    iii. A description of how sampling data and a site base map will be submitted in a manner that is consistent with the Region 2 Electronic Data Deliverable (EDD) format (information available at www.epa.gov/region02/superfund/medd.htm);

    iv. A map depicting sampling locations (to the extent that these can be defined when the QAPP is prepared); and

    v. A schedule for performance of the specific tasks in subparagraphs (c)(i)-(iii) of this Section.

d. In the event that additional sampling locations, testing, and analyses are required or other alterations of the QAPP are required, Respondents shall submit to EPA a memorandum documenting the need for additional data to EPA Project Coordinator within thirty (30) days of identification. EPA in its sole discretion will determine whether the additional data shall be collected by Respondents and whether it shall be incorporated into plans, reports and other deliverables.

e. In order to provide quality assurance and maintain quality control with respect to all samples to be collected, Respondents shall ensure the following:

i. Quality assurance and chain of custody procedures shall be performed in accordance with standard EPA protocol and guidance, including the guidance provided in the EPA Region 2 Quality Assurance website, http://www.epa.gov/region2/qa/;

ii. The laboratory(s) to be used must be specified in the QAPP. Any laboratory selected to provide analytical services shall be accredited by a national or state organization such as the National Environmental Laboratory Accreditation Program ("NELAP") or the American Association for Laboratory Accreditation ("A2LA"). Alternatively, if the laboratory participates in the EPA Contract Laboratory Program ("CLP"), this requirement will be considered as fulfilled. In addition, the laboratory should submit (or the Respondent shall submit on behalf of the laboratory) to EPA current copies (within the past twelve months) of laboratory certification provided from either a State or Federal Agency which conducts certification. The certification shall be applicable to the matrix/analyses which are to be conducted;

iii. The laboratories utilized for analyses of samples must perform all analyses according to approved EPA methods or, if requested by Respondents and approved by EPA, an alternate method;

iv. Unless indicated otherwise in the approved QAPP, upon receipt from the laboratory, all data shall be validated;

v. The validation package (checklist, report and Form I's containing the final data) submitted to EPA shall be prepared in accordance with the provisions of Subparagraph vi. below as part of the RI Report submittal;

vi. Respondents shall assure that all analytical data that are validated as required by the QAPP are validated according to the latest version

of EPA Region 2 data validation Standard Operating Procedures. Region 2 Standard Operating Procedures are available at: http://www.epa.gov/region02/qa/documents.htm;

vii. Unless indicated otherwise in the QAPP, Respondents shall require deliverables equivalent to CLP data packages from the laboratory for analytical data. Upon EPA's request, Respondents shall submit to EPA the full documentation (including raw data) for this analytical data. EPA reserves the right to perform an independent data validation, data validation check, or qualification check on generated data; and

viii. Respondents shall insert a provision in their contract(s) with the laboratory utilized for analyses of samples that requires granting access to EPA personnel and authorized representatives of the EPA for the purpose of ensuring the accuracy of laboratory results related to the Site.

2. A Health and Safety Plan (HSP), which shall conform to 29 CFR §1910.120, "OSHA Hazardous Waste Operations Standards," and the EPA guidance document, "Standard Operating Safety Guidelines" (OSWER, 1988). EPA does not "approve" the HSP.

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B. EPA will approve the RI/FS Work Plan or otherwise respond in accordance with Section IX (EPA Approval of Plans and Other Submissions) of the Settlement Agreement.

IV. TASK 3 - COMMUNITY RELATIONS

To the extent requested by EPA, Respondents shall provide information relating to the work required hereunder for EPA's use in developing and implementing a Community Involvement Plan. As requested by EPA, Respondents shall participate in the preparation of appropriate information to be disseminated to the public, and participate in public meetings at EPA's request, which may be held or sponsored by EPA.

V. TASK 4 – IMPLEMENTATION OF RI/FS WORK PLAN

A. Following EPA's written approval or modification of the RI/FS Work Plan pursuant to Section IX of the Settlement Agreement, Respondents shall implement the provisions of the RI/FS Work Plan. Respondents shall notify EPA at least fourteen (14) days in advance of the field work regarding the planned dates for all field activities, including, but not limited to, geophysical surveys, installation or modification of wells, initiating sampling, installation and calibration of equipment, pump tests, and initiation of analysis and other field investigation activities.

B. Respondents shall provide EPA with validated analytical data within sixty (60) days

after each sampling activity. Additionally, if requested by EPA, Respondents shall make all data available to EPA upon receipt from the lab (prior to validation). All data submitted to EPA shall be compiled in a database format or spreadsheet acceptable to EPA and shall show the location, medium and results for each sample.

C. Within seven (7) days after completion of each phase of field activities, Respondents shall so advise EPA in writing.

D. Within ninety (90) days after submission to EPA of the final set of validated data, or such longer time as specified or agreed to by EPA, Respondents shall submit to EPA a SCSR Addendum. The SCSR Addendum shall include an updated CSM and shall identify any additional data necessary to complete the RI/FS. A narrative summary and compiled spreadsheets, maps, graphs and figures, including but not limited to, an electronic database of all sampling data with coordinates and sampling dates, shall be included. Within thirty (30) days after Respondents' submittal of the SCSR Addendum, or such longer time as specified in writing by EPA, Respondents shall make a presentation to EPA and the State on the findings of the SCSR Addendum. EPA will approve the SCSR Addendum or otherwise respond in accordance with Section IX (EPA Approval of Plans and Other Submissions) of the Settlement Agreement. When approved by EPA, the SCSR Addendum shall be incorporated into the final RI Report when it is completed.

E. Respondents shall provide a monthly progress report and participate in meetings with EPA at major milestones in the RI/FS process, as described herein at Section II (Task 1 - Site Characterization Summary Report); Section V (Task 4.D - Site Characterization Summary Report Addendum); Section X (Task 9.B, Development and Screening of Remedial Alternatives Technical Memorandum); and Section IX (Task 10.A, Feasibility Study Report).
Monthly progress reports shall be submitted on or before the 15th day of each month following the Effective Date of the Settlement Agreement.

Respondent's obligation to submit progress reports continues until EPA gives Respondents written notice of completion of work under Section XXIX of the Settlement Agreement. At a minimum, these progress reports shall include the following:

1. A description of all actions which have been taken toward achieving compliance with the Settlement Agreement during the prior month;

2. A description of any violations of the Settlement Agreement and other problems encountered during the prior month;

3. A description of all corrective actions taken in response to any violations or problems which occurred during the prior month;

4. A summary of the results of all sampling, test results and other data received or generated by Respondents during the course of implementing the Work during the prior month. Such results shall be validated in accordance with the approved Quality Assurance Project Plan developed in conformity with the RI/FS SOW. Also identify all plans, reports, and other deliverables required by the Settlement

Agreement completed and submitted during the previous month in addition to correspondence and/or comments Respondents have received from EPA;

5. A description of any modifications to the work plans or other schedules that Respondents have proposed to EPA or that have been approved by EPA, and a description of all plans, actions, and data scheduled for the next eight weeks. Also a description of all activities undertaken in support of the Community Relations Plan (if requested by EPA) during the previous month and those to be undertaken in the next eight weeks, if requested by EPA;

6. An estimate of the percentage of the Work required by the Settlement Agreement which has been completed as of the date of the progress report; and

An identification of all delays encountered or anticipated that may affect the future schedule for performance of the Work, and all efforts made by Respondents to mitigate delays or anticipated delays.

VI. TASK 5 - IDENTIFICATION OF CANDIDATE TECHNOLOGIES

An Identification of Candidate Technologies Memorandum shall be submitted by Respondents within ninety (90) days after Respondents' submission to EPA of the last set of final validated analytical data; provided, however, that if EPA and Respondents agree, Respondents may submit a portion of that memorandum at an earlier time. The candidate technologies identified shall include innovative treatment technologies (as defined in the RI/FS Guidance) where appropriate. The listing of candidate technologies shall cover the range of technologies required for alternatives analysis. Respondents shall conduct a literature survey to gather information on performance, relative costs, applicability, removal efficiencies, operation and maintenance ("O&M") requirements, and implementability of candidate technologies.

EPA will approve the Identification of Candidate Technologies Memorandum or otherwise respond in accordance with Section IX (Reporting and EPA Approval of Submissions) of the Settlement Agreement. If EPA determines that practical candidate technologies have not been sufficiently demonstrated, or cannot be adequately evaluated for OU3 on the basis of available information, EPA may require that treatability testing be conducted as described in Section VII (Task 6: Treatability Studies; as necessary).

VII. TASK 6 - TREATABILITY STUDIES; AS NECESSARY

Treatability testing shall be performed by Respondents, as necessary, to assist in the detailed analysis of alternatives. Once a decision has been made to perform treatability studies, the following activities shall be performed by Respondents.

A. Evaluate Treatability Studies

EPA, with input from Respondents, will decide on the type of treatability testing to use (e.g., bench versus pilot). Because of the time required to design, fabricate,

and install pilot scale equipment as well as perform testing for various operating conditions, the decision to perform pilot testing should be made as early in the process as possible to minimize potential delays of the FS.

B. Treatability Testing Work Plan

Within ninety (90) days after EPA's written determination that treatability testing is necessary and the decision on the type of treatability testing to be used is made, Respondents shall submit a Treatability Testing Work Plan, including a field sampling and analysis plan and a schedule. The Treatability Testing Work Plan shall describe the background of OU3, remedial technology(ies) to be tested, test objectives, experimental procedures, treatability conditions to be tested, measurements of performance, analytical methods, data management and analysis, health and safety, and residual waste management. The DQOs for treatability testing should be documented as well. If pilot scale treatability testing is to be performed, the Treatability Testing Work Plan shall include a description of pilot plant installation and start-up, pilot plant operation and maintenance procedures, operating conditions to be tested, a sampling plan to determine pilot plant performance, and a detailed health and safety plan. If testing is to be performed, Respondents shall address all necessary permitting requirements to the satisfaction of appropriate authorities.

EPA will approve the Treatability Testing Work Plan or otherwise respond in accordance with Section IX (Reporting and EPA Approval of Submissions) of the Settlement Agreement.

C. Treatability Testing QAPP

If the original QAPP is not adequate for defining the activities to be performed during the treatability test, a separate Treatability Testing QAPP, or amendment to the original QAPP for OU3, shall be prepared by Respondents for EPA review and approval, and shall be submitted at the same time as the Treatability Testing Work Plan. EPA will approve the Treatability Testing QAPP or otherwise respond in accordance with Section IX (Reporting and EPA Approval of Submissions) of the Settlement Agreement.

D. Treatability Testing HSP

If the original HSP is not adequate for defining the activities to be performed during the treatment tests, a separate or amended HSP shall be developed by Respondents and submitted for EPA review and comment. Section III (Task 2 – RI/FS Work Plan) provides additional information on the requirements of the HSP. EPA does not "approve" the treatability testing HSP.

E. Treatability Testing Evaluation Report

Within sixty (60) days after completion (including field work and receipt of all laboratory results, including validated results if data validation is required) of any treatability testing or such longer time as specified or agreed to by EPA, Respondents shall submit a Treatability Testing Evaluation Report to EPA.

The Treatability Testing Evaluation Report shall analyze and interpret the treatability testing results. Depending on the sequences of activities, this report may be a part of the RI/FS Report or a separate deliverable. The report shall evaluate each technology's effectiveness, implementability, cost and actual results as compared with predicted results. The report shall also evaluate full scale application of the technology, including a sensitivity analysis identifying the key parameters affecting full-scale operation.

EPA will approve the Treatability Testing Evaluation Report or otherwise respond in accordance with Section IX (Reporting and EPA Approval of Submissions) of the Settlement Agreement.

VIII. TASK 7 - BASELINE RISK ASSESSMENT

Respondents shall prepare a Baseline Risk Assessment for OU3 which shall be incorporated by Respondents into the RI. Respondents shall provide EPA with the following deliverables:

A. Baseline Human Health Risk Assessment ("BHHRA")

1. Current and potential cancer risks and non-cancer hazards to human health under current and reasonably anticipated future land uses shall be identified and characterized in accordance with CERCLA, the NCP, and EPA guidance documents including, but not limited to, the RI/FS Guidance, "Land Use in the CERCLA Remedy Selection Process" (OSWER Directive No. 9355.7-04), Reuse Assessments: A Tool to Implement the Superfund Land Use Directive" (OSWER 9355.7-04, June 2001), and the definitions and provisions of "Risk Assessment Guidance for Superfund ("RAGS")," Volume 1, "Human Health Evaluation Manual," (December 1989) (EPA/540/1-89/002) and updates (RAGS Parts B, C, D, E, F and Part III available at: http://www.epa.gov/oswer/riskassessment/risk_superfund.htm). Other EPA guidance documents to be used in the development of risk assessments are identified in Attachment 1 to this SOW.

2. Memorandum on Exposure Scenarios and Assumptions

Within ninety (90) days after approval or modification of the RI/FS Work Plan pursuant to Section IX (EPA Approval of Plans and Other Submissions) of the Settlement Agreement or such longer time as specified or agreed to by EPA, Respondents shall submit a Memorandum describing the exposure scenarios and assumptions for the BHHRA, taking into account the current and reasonably

anticipated future land use of OU3 based on conditions at the time the Memorandum is prepared. The Memorandum shall include appropriate text describing the conceptual site model and exposure routes of concern for OU3, and include a completed RAGS Part D Table 1. This table shall describe the pathways that will be evaluated in the BHHRA, the rationale for their selection, and a description of those pathways that will not be evaluated and the rationale for excluding these pathways. Upon request, Respondents shall provide EPA with the electronic database or spreadsheets used in preparation of RAGs Tables presented in the Memorandum.

In addition, the Memorandum shall include a completed RAGS Part D Table 4 describing the exposure pathway parameters with appropriate references to EPA's 1991 Standard Default Assumptions, the Supplemental Guidance for Developing Soil Screening Levels for Superfund sites (2002) and updates to this guidance developed by the EPA Superfund Program, or, where other, site-specific exposure assumptions are proposed, a detailed rationale and supporting basis for those assumptions, to be presented for EPA review and approval. In the event that chemicals with a mutagenic mode of action are identified (as described in USEPA 2005a,b and the Handbook for Implementing the Supplemental Cancer Guidance at Waste and Cleanup Sites al Cancer Guidance at Waste and Cleanup Sites (http://www.epa.gov/oswer/riskassessment/sghandbook/chemicals.htm), specific exposure assumptions for age groups 1 to younger than 16 shall be developed and submitted to EPA for evaluation and approval.

EPA will approve the Memorandum or otherwise respond in accordance with Section IX (EPA Approval of Plans and Other Submissions) of the Settlement Agreement.

3. Pathway Analysis Report ("PAR")

Respondents shall prepare and submit a PAR within ninety (90) days after Respondents' submission to EPA of the last set of validated data or EPA's approval of the *Memorandum on Exposure Scenarios and Assumptions*, whichever is later. The PAR shall be developed in accordance with OSWER Directive 9285.7-01D dated January 1998 (or more recent version), entitled, "*Risk Assessment Guidelines for Superfund Part D*" and other appropriate guidance in Attachment 1 and updated thereto.

The PAR shall contain the information necessary for a reviewer to understand how the risks at OU3 will be assessed. The PAR shall build on the Memorandum on Exposure Scenarios and Assumptions (see VIII. Task 7.A.2 above) describing the risk assessment process and how the risk assessment shall be prepared. The PAR shall include completed RAGS Part D Tables 2, 3, 5, and 6 as described below. Upon request, Respondents shall provide EPA with the electronic database or spreadsheets used in preparation of RAGs Tables presented in the PAR. EPA will approve the PAR or otherwise respond in accordance with Section IX (EPA

Approval of Plans and Other Submissions) of the Settlement Agreement. The PAR must be reviewed and approved by EPA prior to the submission of the BHHRA. The following information shall be included in the PAR:

a. Chemicals of Potential Concern ("COPCs"). The PAR shall contain all the information necessary for a reviewer to understand how the risks at OU3 will be evaluated.

Based on the validated analytical data, Respondents shall list the hazardous substances present in all sampled media (e.g., groundwater, soils, etc.) and the COPCs as described in RAGS Part A.

b. Table 2 - Selection of COPCs. COPCs and associated concentrations in sample media for the PAR shall be determined utilizing all currently available media-specific validated analytical data generated during the RI/FS. The selection of COPCs shall follow RAGS Part A; and before hazardous substances are eliminated as COPCs, they shall be evaluated against the residential and industrial screening levels in accordance with the current version of the "Regional Screening Levels for Chemical Contaminants at Superfund Sites" screening level/preliminary remediation goal website (http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm). The industrial screening level shall not be used as a basis for eliminating any hazardous substance as a COPC. In addition, background shall not be used as a basis to exclude COPCs. The COPCs shall be presented in completed RAGS Part Table 2 format.

c. Table 3 - Media Specific Exposure Point Concentrations. Using the COPCs selected in Table 2, this Table shall summarize the Exposure Point Concentration ("EPC") for all COPCs for the various media. The calculation of the EPC shall follow the Supplemental Guidance to RAGS: Calculating the Concentration Term (1992), using EPA's ProUCL 5.0.00 Software or later versions (http://www.epa.gov/osp/hstl/tsc/software.htm), which evaluates the distribution of the data using Shapiro-Wilk's and Lilliefor's tests, in accordance with 2013 ProUCL's User's Guide (available at: http://www.epa.gov/osp/hstl/tsc/ProUCL_v5.0_user.pdf) and provides recommendations for EPCs. In those cases where the 95% Upper Confidence Limit ("UCL") exceeds the maximum, the maximum concentration shall be used as the EPC.

d. Tables 5 and 6 - Toxicological Information. This section of the PAR shall provide the toxicological data (e.g., Cancer Slope Factors, Inhalation Unit Risk Factors, Reference Doses, Reference Concentrations, Weight of Evidence Classifications for Carcinogens, and adjusted dermal toxicological factors where appropriate) for the COPCs. Chemicals with a mutagenic mode of action need to be identified in Tables 5 and 6 consistent with the EPA Cancer Guidelines (USEPA, 2005a), Supplemental Guidance for Assessing Susceptibility from Early Life Exposure to

Carcinogens (USEPA, 2005b), and Handbook for Implementing the Supplemental Cancer Guidance at Waste and Cleanup Sites (available at: http://www.epa.gov/oswer/riskassessment/sghandbook/chemicals.htm) The toxicological data shall be presented in completed RAGS Part D Tables 5 and 6. The sources of data in order of priority, based on the 2003 OSWER Directive 9285.7-53, are:

- Tier 1 – Integrated Risk Information System ("IRIS") database (EPA, 2007).
- Tier 2 – Provisional Peer Reviewed Toxicity Values ("PPRTV") – The Office of Research and Development/National Center for Environmental Assessment/Superfund Health Risk Technical Support Center ("STSC") develops PPRTVs on a chemical specific basis when requested by EPA's Superfund program. Provisional values shall either be obtained from the PPRTV webpage available at: http://hhpprtv.ornl.gov/, the "Regional Screening Levels for Chemical Contaminants at Superfund Sites," or from Region 2.
- Tier 3 – Other Toxicity Values – Tier 3 includes additional EPA and non-EPA sources of toxicity information. Priority shall be given to those sources of information that are the most current, the basis for which is transparent and publicly available and which have been peer reviewed. Tier 3 values include toxicity values obtained from the California Environmental Protection Agency ("Cal EPA") available at: http://www.oehha.ca.gov/risk/chemicalDB/index.asp., Agency for Toxic Substances and Disease Registry's ("ATSDR's") Minimum Risk Levels ("MRLs"), and toxicity values obtained from the HEAST (EPA 1997b).

To facilitate a timely completion of the PAR, Respondents shall submit a list of chemicals for which IRIS values are not available to EPA as soon as identified thus allowing EPA to facilitate obtaining this information from EPA's National Center for Environmental Assessment.

4. Baseline Human Health Risk Assessment Reporting

Within ninety (90) days after EPA's approval of the PAR, Respondents shall submit to EPA a Baseline Human Health Risk Assessment ("BHHRA") for inclusion in the RI. The submittal shall include completed RAGS Part D Tables 7 through 10 summarizing the calculated cancer risks and non-cancer hazards and appropriate text in the risk characterization with a discussion of uncertainties and critical assumptions (e.g., background concentrations and conditions). Respondents shall perform the BHHRA in accordance with the approach and parameters described in the Memorandum of Exposure Scenarios and Assumptions and the PAR, as described above, including a discussion of uncertainties and other qualifications (if any). Text and tables from these reports previously reviewed by

EPA shall be included in the appropriate sections of the BHHRA. Upon request, Respondents shall provide EPA with the electronic database or spreadsheets used in preparation of RAGs Tables presented in the BHHRA.

EPA will approve the BHHRA or otherwise respond in accordance with Section IX (EPA Approval of Plans and Other Submissions) of the Settlement Agreement. Upon approval by EPA, the BHHRA shall be incorporated into the RI Report.

IX. TASK 8 - REMEDIAL INVESTIGATION REPORT

Respondents shall prepare and submit a RI Report that accurately establishes the characteristics for OU3, including, but not limited to, identification of the contaminated media, and the potential for the contamination to migrate further, the degree to which contaminant degradation is occurring, and the physical boundaries of the contamination. This report shall summarize results of field activities to characterize OU3, sources of contamination, and the fate and transport of contaminants. Pursuant to this objective, Respondents shall obtain only the minimum essential amount of detailed data necessary to determine the key contaminants movement and extent of contamination. The key contaminants shall be selected based on persistence and mobility in the environment and the degree of hazard. Respondents shall use existing standards and guidelines such as drinking water standards, water quality criteria, and other criteria accepted by EPA as appropriate for the situation, which shall be used to evaluate effects on human receptors that may be exposed to the key contaminants above appropriate standards or guidelines. The RI Report shall incorporate information presented in the approved SCSR including all addenda and the BHHRA Report.

The RI Report shall be written in accordance with the "Guidance for Conducting Remedial Investigations/Feasibility Studies under CERCLA," OSWER Directive 9355.3-01, October 1988, Interim Final (or latest revision) and "Guidance for Data Usability in Risk Assessment," (EPA/540/G-90/008), September 1990 (or latest revision).

Respondents shall refer to the RI/FS Guidance for an outline of the report format and contents. EPA will approve the RI Report or otherwise respond in accordance with Section IX of the Settlement Agreement.

X. TASK 9 – FEASIBILITY STUDY - DEVELOPMENT AND SCREENING OF REMEDIAL ALTERNATIVES

Concurrently with the RI site characterization described in Sections III and V (Tasks 2 and 4 of this SOW, respectively), Respondents shall begin to develop and evaluate remedial action objectives that, at a minimum, ensure protection of human health and the environment. The development and screening of remedial alternatives shall identify and develop an appropriate range of remedial action objectives. This range of alternatives shall include the following: 1) options in which treatment is used to reduce the toxicity, mobility, or volume of wastes, including, at a minimum, the principal threats posed by OU3, but that vary in the types of treatment, the amount treated, and the manner in which long-term residuals or untreated wastes are managed; 2)

options involving containment with little or no treatment; 3) options involving both treatment and containment; 4) options that remove or destroy waste; 5) innovative technologies to the extent practicable; and 6) a no-action alternative. The following activities shall be performed as a function of the development and screening of remedial alternatives.

A. Development and Screening of Remedial Alternatives

1. Develop Remedial Action Objectives

Respondents shall develop remedial action objectives, which are medium-specific goals for protecting human health or the environment that specify the chemicals of concern ("COCs"), exposure route(s) and receptor(s) and preliminary remediation goals ("PRGs").

2. Develop General Response Actions

Respondents shall develop general response actions for each medium of interest defining containment, treatment, excavation, pumping, or other actions, singly or in combination to satisfy the remedial action objective.

3. Identify Areas or Volumes of Media

Respondents shall identify areas or volumes of media to which general response actions may apply, taking into account requirements for protectiveness as identified in the remedial action objectives. The chemical and physical characterization of OU3 shall also be taken into account.

4. Assemble and Document Alternatives

Respondents shall assemble selected representative technologies into alternatives for each affected medium.

Together, all of the alternatives shall represent a range of treatment and containment combinations that shall address OU3. A summary of the assembled alternatives and their related action-specific ARARs shall be prepared by Respondents for inclusion in the Development and Screening of Remedial Alternatives Technical Memorandum.

The reasons for eliminating alternatives during the preliminary screening process shall be specified and documented.

5. Refine Alternatives

Respondents shall refine the remedial alternatives to identify contaminant volume addressed by the proposed process and sizing of critical unit operations, as necessary. Sufficient information shall be collected for an adequate comparison of

alternatives. PRGs for each chemical in each medium shall also be modified as necessary to incorporate any new risk assessment information presented in the baseline risk assessment report. Additionally, action-specific ARARs shall be updated as the remedial alternatives are refined.

6. Conduct and Document Screening Evaluation of Each Alternative

Respondents may perform a final screening process based on short and long term aspects of effectiveness, implementability, and relative cost. Generally, this screening process is only necessary when there are many feasible alternatives available for detailed analysis. If necessary, the screening of alternatives shall be conducted to assure that only the alternatives with the most favorable composite evaluation of all factors are retained for further analysis. As appropriate, the screening shall preserve the range of treatment and containment alternatives that was initially developed. The range of remaining alternatives shall include options that use treatment technologies and permanent solutions to the maximum extent practicable.

B. Development and Screening of Alternatives Deliverables

Within one-hundred and twenty (120) days after the later (a) EPA's approval of the BHHRA Report or (b) EPA's approval of the Respondent's Treatability Testing Evaluation Report (if treatability studies are undertaken), or such longer time as specified or agreed to by EPA, Respondents shall submit a Development and Screening of Remedial Alternatives Technical Memorandum summarizing the work performed in, and the results of, each task in Section X.A above, including an alternatives array summary. The Memorandum shall also summarize the reasoning employed in screening, arraying alternatives that remain after screening, and identifying the action-specific ARARs for the alternatives that remain after screening. The Memorandum shall also provide an explanation for choosing any institutional or engineering controls as part of any remedial alternative, and the level of effort that will be required to secure, maintain, and enforce the control. Within thirty (30) days after submission of the Memorandum, or such longer time as specified in writing by EPA, Respondents shall make a presentation to EPA and the State, identifying the remedial action objectives and summarizing the development and preliminary screening of remedial alternatives. EPA will approve the Memorandum or otherwise respond in accordance with Section IX of the Settlement Agreement.

C. Detailed Analysis of Remedial Alternatives

The detailed analysis shall be conducted by Respondents to provide EPA with the information needed to allow for the selection of a remedy for OU3.

1. Detailed Analysis of Alternatives

Respondents shall conduct a detailed analysis of alternatives which shall consist of an analysis of each option against a set of nine evaluation criteria as set forth in 40 C.F.R. § 300.430(e)(9)(iii) and a comparative analysis of all options using the same evaluation criteria as a basis for comparison.

2. Apply Nine Criteria and Document Analysis

Respondents shall apply the nine evaluation criteria to the assembled remedial alternatives to ensure that the selected remedial alternative will be protective of human health and the environment; will be in compliance with, or include a waiver of, ARARs; will be cost-effective; will utilize permanent solutions and alternative treatment technologies, or resource recovery technologies, to the maximum extent practicable; and will address the statutory preference for treatment as a principal element. The evaluation criteria are: (1) overall protection of human health and the environment; (2) compliance with ARARs; (3) long-term effectiveness and permanence; (4) reduction of toxicity, mobility, or volume; (5) short-term effectiveness; (6) implementability; (7) cost; (8) State (or support agency) acceptance; and (9) community acceptance.

For each alternative, Respondents shall provide: (1) a description of the alternative that outlines the remedial strategy involved and identifies the key ARARs associated with each alternative, and (2) a discussion of the individual criterion assessment. If Respondents do not have direct input on criteria (8) State (or support agency) acceptance and (9) community acceptance, these criteria will be addressed by EPA.

3. Compare Alternatives against Each Other and Document the Comparison of Alternatives

Respondents shall perform a comparative analysis among the remedial alternatives. That is, each alternative shall be compared against the others using the nine evaluation criteria as a basis of comparison. Identification and selection of the preferred alternative are reserved by EPA. Respondents shall incorporate the results of the comparative analysis in the FS Report.

XI. TASK 10 - FEASIBILITY STUDY REPORT

A. Respondents shall prepare a FS Report consisting of a detailed analysis of the remedial alternatives, in accordance with the NCP as well as the most recent guidance. Within one-hundred and twenty (120) days after EPA's approval of the Development and Screening of Remedial Alternatives Technical Memorandum or the final RI Report, whichever is later, or such longer time as specified or agreed to by EPA, Respondents shall submit to EPA a FS Report which reflects the findings in the approved BHHRA. Respondents shall refer to the RI/FS Work Plan and the RI/FS Guidance and this SOW for report content and format. Within thirty (30) days after submission of the FS Report, or such longer time as specified in writing by EPA,

Respondents shall make a presentation to EPA and the State at which Respondents shall summarize the findings of the FS Report and discuss EPA's preliminary comments and concerns, if any, associated with the FS Report.

B. The FS Report shall include the following:

1. Summary of Feasibility Study objectives;

2. Summary of remedial action objectives;

3. Articulation of general response actions;

4. Identification and screening of remedial technologies;

5. Descriptions of remedial alternatives;

6. Detailed analysis of remedial alternatives; and

7. Summary and conclusion.

Respondents' technical feasibility considerations shall include the careful study of any problems that may prevent a remedial alternative from mitigating site problems. Therefore, the site characteristics from the RI must be kept in mind as the technical feasibility of the alternative is studied. Specific items to be addressed are reliability (operation over time), safety, operation and maintenance, ease with which the alternative can be implemented, and time needed for implementation.

C. EPA will approve the FS Report or otherwise respond in accordance with Section IX (Reporting and EPA Approval of Submissions) of the Settlement Agreement.